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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,072	02/14/2002	Andreas Fischer	P0877	3504

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EXAMINER

LEE, WILSON

ART UNIT PAPER NUMBER

2821

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/077,072

Applicant(s)

FISCHER ET AL.

Examiner

Wilson Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

Claim Rejections – 35 U.S.C. 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-19, 22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding Claims 1, 13, 18, "a ground extension adjacent said first powered electrode and surrounding said first powered electrode within the volume" is not taught in the specification and figures. According to applicant's remark dated 8/22/03, lines 11-12, applicant clarified that the volume defined within the confinement rings is above the ground extension. In addition, Figure 2 illustrates that the ground extension (160) is not shown within the volume defined by the confinement rings (166). The ground extension (160) is clearly located under the confinement rings (166) but not within the volume as claimed (See Figure 2 of the instant application). Hence, the specification and figures fail to show the ground extension within the volume defined by the confinement rings to enable one skilled in the art to make/use the invention.

Claims 2-12, 14-17, 19 and 22 are vague by virtue of their dependency on claims 1, 13, 18.

Claim Rejections – 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 6-15, 18, 19 and 22, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (6,178,919).

Regarding Claim 1, Li discloses a plasma processing chamber configured to generate a confined plasma (130) (See Figure 2 and Col. 4, lines 30-45), comprising:

- A bottom electrode (110) as a first powered electrode configured to receive a work piece (substrate 114), the first powered electrode (110) having a first electrode area (the top surface of the first electrode 110);
- A RF power source (112) as a power generator operatively coupled to the first powered electrode (110) and configured to communicate power to the first powered electrode (110);
- A top electrode (104) as a second electrode disposed at a distance from the first powered electrode (110), the first powered electrode (110) and the second electrode configured to convert the gas to a plasma (See Col. 2, lines 53-56), the second

electrode (104) have a second electrode area (the under part of the second electrode 104);

- A plurality of confinement rings (124) surrounding a volume within which the confined plasma is substantially disposed (See Figure 2) (Col. 6, lines 1-5, show that the plasma is substantially confined and Abstract shows that the confinement rings is disposed so that the plasma generated therefrom will be disposed as well inside the chamber); and
- a ground extension (not shown in figure but shown in his teachings) adjacent said first powered electrode (110) and surrounding the first powered electrode (110) near the volume since Li teaches that the chamber wall (102) which surrounds the first electrode (110) can be coupled to ground (See attached Figure 2, Col. 2, lines 34-45 and Col. 4, lines 9-12).

Regarding Claim 2, Li discloses a confinement ring (122) configured to confine said plasma, the one confinement ring (122) surrounding said first powered electrode (110) (See Figure 2).

Regarding Claim 6, Li discloses that the ground extension (not shown in figure but shown in his teachings) surrounds said first powered electrode (110) since Li teaches that the chamber wall (102) which surrounds the first electrode (110) can be coupled to ground (See attached Figure 2, Col. 2, lines 34-45 and Col. 4, lines 9-12).

Regarding Claim 7, Li discloses that ground extension (not shown in figure but shown in his teachings) is configured to drain charge (electron) from said plasma since Li teaches that the chamber wall (102) can be coupled to ground (See attached Figure 2, Col. 2, lines 34-45 and Col. 4, lines 9-12).

Regarding Claim 8, since Li discloses that the second electrode area (the under part of the second electrode 104) is greater than the first electrode area (the surface of the first electrode 110) (See Figure 2). Therefore, the electrode area ratio would be greater than 1.0 if the area ratio defined by dividing the second electrode area by the first electrode area.

Regarding Claim 9, Li discloses that the second electrode (110) further comprises a notch (labeled by examiner in attached Figure 2), the notch configured to increase said second electrode area (See attached Figure 2).

Regarding Claim 10, Li discloses that the ground extension (not shown in figure but it is taught by Li) surrounds the first powered electrode (110). For example, ground terminals supposedly coupled to the walls 102) surrounds the first power electrode (110) since Li teaches that the chamber wall (102) which surrounds the first electrode (110) can be coupled to ground (See attached Figure 2, Col. 2, lines 34-45 and Col. 4, lines 9-12).

Regarding Claim 11, Li discloses that ground extension (not shown in figure but it is taught by Li) is configured to drain charge (electron) from the plasma since Li teaches that the chamber wall (102) can be coupled to ground (See Figure 2, Col. 2, lines 34-45 and Col. 4, lines 9-12).

Regarding Claim 12, since Li discloses that the second electrode area (the under part of the second electrode 104) is greater than the first electrode area (the top surface of the first electrode 110) (See Figure 2). Therefore, the electrode area ratio would be greater than 1.0 if the area ratio defined by dividing the second electrode area by the first electrode area.

Regarding Claim 13, Li discloses a plasma processing chamber configured to generate a confined plasma (130) (See Figure 2 and Col. 4, lines 30-45), comprising:

- A bottom electrode (110) a first powered electrode configured to receive a work piece (substrate 114), the first powered electrode (110) having a first electrode area (the top surface of the first electrode 110);
- A RF power source (112) as a power generator operatively coupled to the first powered electrode (110) and configured to communicate power to the first powered electrode (110);
- A top electrode (104) as a second electrode disposed at a distance (132) from the first powered electrode, the first powered electrode (110) and the second electrode (104) configured to convert the gas to a plasma (130) (See Col. 2, lines 53-56) and the second electrode (104) having a second electrode area (the surface under the flat electrode 104);
- A plurality of confinement rings (124) surrounding the first powered electrode (110) and the second electrode (104) and

defining a volume within which the confined plasma is substantially disposed (See Figure 2) (Col. 6, lines 1-5, show that the plasma is substantially confined and Abstract shows that the confinement rings is disposed so that the plasma generated therefrom will be disposed as well inside the chamber); and

- A ground extension (not shown in figure but shown in his teachings) adjacent the first powered electrode (110) since Li teaches that the chamber wall (102) which surrounds the first electrode (110) can be coupled to ground (See Col. 4, lines 9-12) and surrounding the first powered electrode (110) near the volume confined by the plurality of confinement rings (124) (See Attached figure 2 labeled by examiner).

Regarding Claim 14, Li discloses that ground extension (not shown in figure but it is taught by Li) is configured to drain charge from said plasma (See attached Figure 2) since Li teaches that the chamber wall (102) which surrounds the first electrode (110) can be coupled to ground (See Col. 2, lines 34-45 and Col. 4, lines 9-12).

Regarding Claim 15, since Li discloses that the second electrode area (the under part or surface of the second electrode 104) is greater than the first electrode area (the top surface of the first electrode 110) (See Figure 2). Therefore, the electrode area ratio would be greater than 1.0 if the area ratio defined by dividing the second electrode area by the first electrode area.

Regarding Claim 18, Li discloses a method for generating a confined plasma in a plasma processing chamber (See Figure 2) including a plurality of confinement rings (124) surrounding a volume within which the confined ring plasma (130) is substantially disposed (See attached Figure 2) (Col. 6, lines 1-5, show that the plasma is substantially confined and Abstract shows that the confinement rings is disposed so that the plasma generated therefrom will be disposed as well inside the chamber), the method comprising:

- receiving a gas (from apertures 105. See Col. 4, lines 13-14) in the plasma processing chamber (See Col. 4, lines 30-35);
- causing a bottom electrode (110) as a first electrode to receive a work piece (substrate 114) the first electrode (110) operatively coupled to a power supply (112);
- causing a top electrode (104) as a second electrode disposed at a distance (132) from the first electrode (110) to receive RF power from the first electrode, the second electrode (104) having a second electrode area that is greater than said first electrode area (See Figure 2);
- engaging a power supply (112) to communicate RF power to the first electrode (110) to generate a plasma; and
- positioning a ground extension (not shown in figure but shown in his teachings) adjacent the first electrode (110) and near the volume defined by the plurality of confinement rings (124) (See attached figure 2) to drain a plurality of charge (electrons) from the

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plasma since Li teaches that the chamber wall (102) which surrounds the first electrode (110) can be coupled to ground (See Col. 4, lines 9-12).

Regarding Claim 19, Li discloses draining (e.g. grounding) the plurality of charge (electron) at a plasma boundary defined by at least one confinement ring (122) (See Figure 2 and Col. 2, lines 34-45).

Regarding Claim 22, Li discloses that the ground extension is separated from the first powered electrode (110) by a dielectric (Teflon shroud 120. See Col. 2, line 25. See Attached Figure 2).

Response to Arguments

Applicant's arguments filed on 8/22/03 have been fully considered but they are not persuasive.

Applicant argues that Li fails to disclose a volume defined by confinement rings.

Examiner respectfully disagrees.

Li clearly discloses a volume (contained plasma) defined by confinement rings (See attached Figure 2).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a ground extension adjacent to the lower electrode that has surface area within the volume defined by confinement rings, a ground extension that lies generally in a plane parallel to the workpiece) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification,

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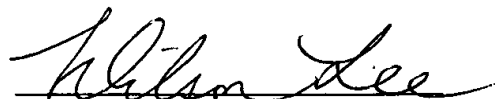
limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Drawing

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "160" has been used to designate both ground electrode and ground extension (See page 15, lines 13, 14). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Wilson Lee whose telephone number is (703) 306-3426. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (703) 308-0956. The Technology Center Fax Center number is (703) 308-7722 or (703) 308-7724.



Patent Examiner
Art Unit 2821
U.S. Patent & Trademark Office

WL
9/8/03

